EXAMPLE 1 ➤ Write $\log_5 c = a$ in exponential form.

SOLUTION Think this:

- "$\log_5$…" is read "log *base* 5…," so 5 is the base.
- A logarithm is an *exponent*. Because the log equals a, a must be the exponent.
- The "answer" I get for 5^a is the argument of the logarithm, c.

Write only this:

$$5^a = c$$ ◀

EXAMPLE 2 ➤ Write $z^4 = m$ in logarithmic form.

SOLUTION $\log_z m = 4$

◀

Two bases of logarithms are used frequently enough to have their own key on most calculators. One is base-10 logarithms, or **common logarithms,** as you saw in the previous section. The other is base-e logarithms, called **natural logarithms,** where $e = 2.71828\ldots$, a naturally occurring number (like π) that you will find advantageous later in your mathematical studies. The symbol $\ln x$ (pronounced "el en of x") is used for the natural logarithms: $\ln x = \log_e x$.

Nautilus shells have a logarithmic spiral pattern.

DEFINITION: Common Logarithm and Natural Logarithm

Common: The symbol $\log x$ means $\log_{10} x$.

Natural: The symbol $\ln x$ means $\log_e x$, where e is a constant equal to 2.71828182845…

To find the value of a base-e logarithm, just press the key on your grapher. For instance,

$$\ln 30 = 3.4011\ldots$$

To show what this answer means, raise e to the 3.4011… power.

$e^{3.4011\ldots} = 30$ Use the e^x key. Do not round the 3.4011….

Example 3 shows you how to find a logarithm with a base that is not built into your calculator.